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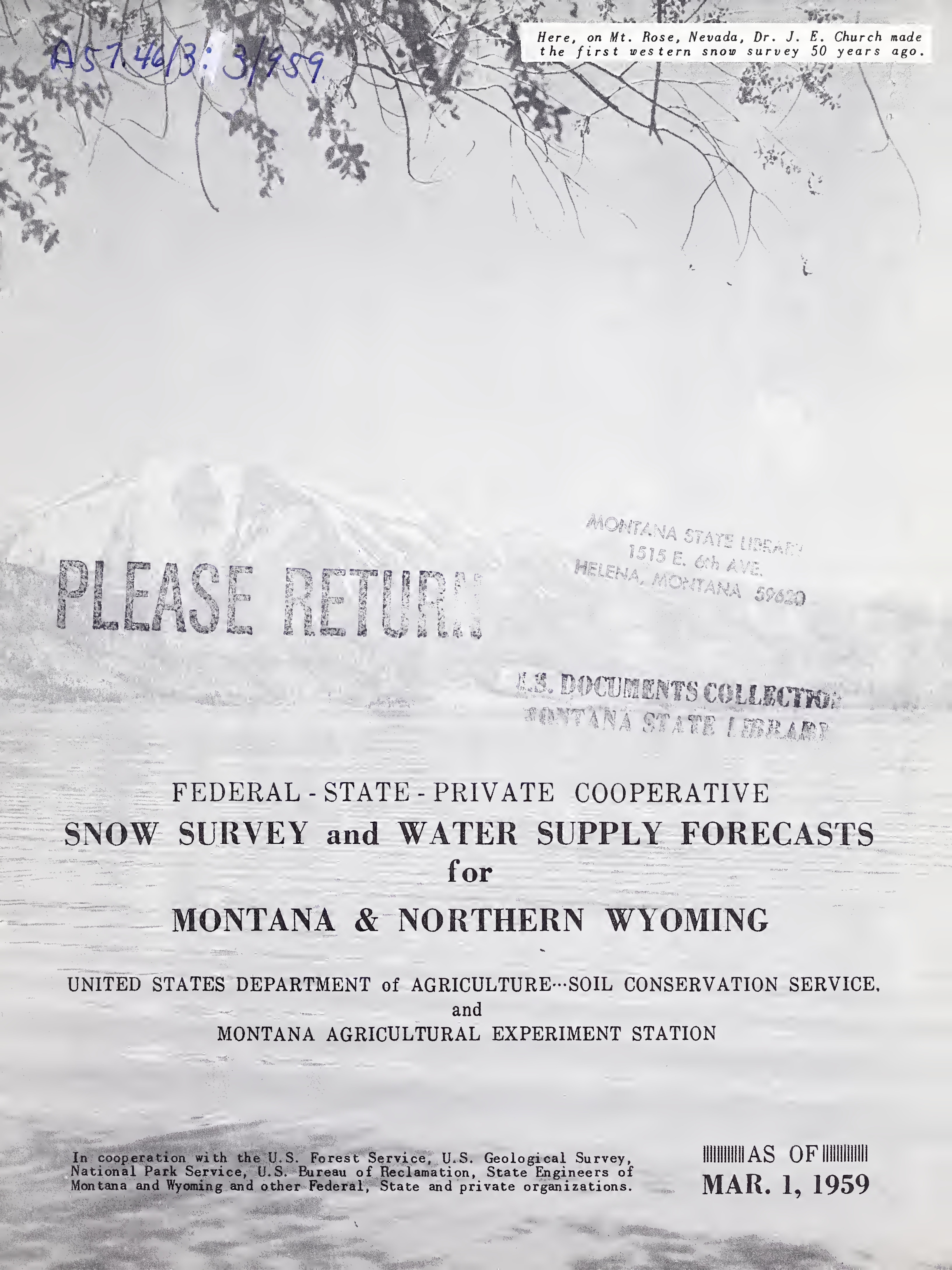

Here, on Mt. Rose, Nevada, Dr. J. E. Church made the first western snow survey 50 years ago.

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SNOW SURVEY and WATER SUPPLY FORECASTS for MONTANA & NORTHERN WYOMING

UNITED STATES DEPARTMENT of AGRICULTURE···SOIL CONSERVATION SERVICE,
and
MONTANA AGRICULTURAL EXPERIMENT STATION

In cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, U.S. Bureau of Reclamation, State Engineers of Montana and Wyoming and other Federal, State and private organizations.

AS OF
MAR. 1, 1959

UNITED STATES DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

TO RECIPIENTS OF COOPERATIVE SNOW SURVEY AND WATER SUPPLY FORECAST REPORTS:

The climate of the cultivated and populated areas of the West is characterized by relatively dry summer months. Such precipitation as occurs falls mostly in the winter and early spring months when it is of little immediate benefit to growing crops. Fortunately, most of this precipitation falls as mountain snow which stays on the ground for months, melting later to sustain streamflow during the period of greatest demand during late spring and summer. Thus, nature provides in mountain snow an imposing water storage facility.

The amount of water stored in mountain snow varies from place to place as well as from year to year and accordingly, so does the runoff of the streams. The best seasonal management of variable western water supplies results from fore-knowledge of the runoff.

A snow survey consists of a series of about ten samples taken with specially designed snow sampling equipment along a permanently marked line, about 1000 feet in length, called a snow course. The use of snow sampling equipment provides snow depth and water equivalent values for each sampling point. The average of these values is reported as the snow survey measurement for a snow course.

Snow surveys are made monthly or semi-monthly beginning in January or February and continue through the snow season until April, May or June. Currently more than 1300 western snow courses are measured each year. These measurements furnish the key data for water supply forecasts.

By relating snow survey measurements taken over a period of years to spring-summer runoff during the same period, relationships have been developed which make it possible to forecast seasonal runoff several months in advance of occurrence. In order to make a forecast, once a forecast relationship has been developed, the maximum snow water content at previously selected key snow courses is usually entered in the forecast relationship. More accurate forecasts are often obtained when other factors such as soil moisture, base flow and spring precipitation are considered and included in the forecast relationships.

Listed below are the Federal-State-Private Cooperative Snow Survey and Water Supply Forecast reports available for the West which contain detailed information on snow survey measurements, streamflow forecasts, reservoir storage, soil moisture and other guide data to water management and conservation decisions.

PUBLISHED BY SOIL CONSERVATION SERVICE

REPORTS	ISSUED	COOPERATING WITH	LOCATION
RIVER BASINS			
Colorado, Rio Grande and Arkansas	Monthly (Feb.-May)	Colo. Exp. Station Colo. State Engineer New Mexico State Engineer	Ft. Collins, Colo.
Columbia *Includes Alaska*	Monthly (Jan.-May)	Idaho State Engineer	Boise, Idaho
Upper Missouri	Monthly (Feb.-May)	Mont.Agr.Exp.Station	Bozeman, Montana
West-Wide	(Oct. 1, Apr. 1 and May 1)	Cooperators	Portland, Oregon
STATES			
Arizona	Semi-Monthly (Jan. 15-Apr.1)	Salt R. Valley Water Users Association	Phoenix, Arizona
Nevada	Monthly (Feb.-Apr.)	Nevada State Engineer	Reno, Nevada
Oregon	Monthly (Jan.-May)	Ore.Agr.Exp.Station	Portland, Oregon
Utah	Monthly (Jan.-May)	Utah State Engineer Utah Agr.Exp.Station	Salt Lake City, Utah
Washington	Monthly (Feb.-May)	Wash. State Dept. of Conservation	Spokane, Washington
Wyoming	Monthly (Feb.-June)	Wyoming State Engineer	Casper, Wyoming

Copies of the various reports may be secured from:

Head, Water Supply Forecasting Section
Soil Conservation Service
209 S.W. 5th Avenue, Portland 4, Oregon

PUBLISHED BY OTHER AGENCIES

OTHER SNOW SURVEY REPORTS		
British Columbia	Monthly (Feb.-June)	Comptroller, Water Rights Br., Dept. of Lands and Forests, Parliament Bldgs. Victoria, B.C.
California	Monthly (Feb.-May)	California Department of Water Resources, Sacramento, California

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FEDERAL-STATE-PRIVATE COOPERATIVE
SNOW SURVEYS and WATER SUPPLY FORECASTS
for
MONTANA AND NORTHERN WYOMING

(Upper Missouri and Upper Columbia River Basins)

Report Prepared by:

A. R. Codd
Hydraulic Engineer
Soil Conservation Service

Soil Conservation Service
U. S. Department of Agriculture
and
Montana Agricultural Experiment Station
Bozeman, Montana

Report Issued by:

H. D. Hurd
State Conservationist
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O. W. Monson
Irrigation Engineer
Montana Agricultural
Experiment Station

R. E. Huffman
Director
Montana Agricultural
Experiment Station

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WATER SUPPLY OUTLOOK
FOR MONTANA
March 1, 1959

The March first Water Supply Outlook for Montana, generally, is GOOD.

The Missouri Basin streams in Montana are expected to flow between 81 and 104 percent average.

The Columbia Basin streams in Montana are expected to flow between 113 and 150 percent average. Exceptionally large snow water content figures exist on the Flathead River, Swan and Blackfoot Basins. Many of them are record highs for March first.

Storage in hydro and irrigation reservoirs is about average for March first. No marked shortage exists. February stream-flow continued above average.

MISSOURI RIVER BASIN

JEFFERSON RIVER:

March first snow surveys indicate a fair snow-pack on the tributary basins to the Jefferson River. Stream-flow forecasts indicate 81 percent average at Monida, 85 percent at Barratts, and 92 percent on the Big Hole River. These forecasts show five percent less flow than last season. The apparent drought condition of southeastern Idaho is showing its affect on the headwaters of the Beaverhead River. Detail volume forecasts and comparisons are shown on the forecast sheets.

MADISON RIVER:

The Madison River Basin has a good snow-pack for March first. There is 18 percent more water content than last year. Stream-flow into Hebgen Reservoir should be 93 percent average. Hebgen Reservoir is 72 percent below average; however, with the anticipated 384,000 acre-feet forecast for April through September, there should be little difficulty in filling the reservoir.

GALLATIN RIVER:

March first snow surveys indicate a 114 percent average snow-pack this season. This should result in an excellent water supply for most of the irrigation season, with local shortages occurring only during the last months.

MISSOURI RIVER MAIN STEM:

There is an excellent water supply on the mountains of the tributaries to the Missouri from Toston to Fort Benton. The exceptionally deep snow on the Continental Divide from Stemple Pass, opposite Wolf Creek, north to the Canadian border will produce an excellent water supply this season with considerable surplus.

Gibson Reservoir is forecast to receive 787,000 acre feet of water between April first and September 30 or 137 percent average.

Detail figures and comparison data are listed in the forecasts of streamflow.

COLUMBIA RIVER BASIN

CLARK FORK RIVER:

An exceptionally large snow-pack exists on most of the tributary streams to the Clark Fork River. An average of the snow water content measured on the 21 snow survey courses shows this year's March snow-pack to be 135 percent average. The anticipated stream-flow from the Blackfoot River is forecast at 150 percent average and from the Bitterroot, 105 percent. The apparent Idaho drought condition is reflected in this southerly stream.

FLATHEAD RIVER:

A record high March first snow-pack exists on many of the snow courses in the Mission Range, Swan Range, and in the South Fork of the Flathead. Providing a normal accumulation of snow is experienced during March, the northern tributaries to the Flathead should produce 115 percent normal flow at Columbia Falls. The South Fork is forecast at 118 percent average or 2,446,000 acre feet for the April-September period.

SWAN RIVER BASIN:

The Swan River Basin is located in the heaviest snow-pack belt. Attention is directed to measurements of snow survey courses Big Creek, Strawberry Lake, Trinkus Lake, Upper Holland Lake and North Fork Jocko. Comparison with average data for these courses is startling. These and many other courses in the Flathead Basin have a greater water content than the April first average. This condition will bear watching for exceptionally large spring flows. High temperatures and clear days could cause rapid melting.

MONTANA STREAM-FLOW FORECASTS MARCH 1, 1959

The following summarized runoff forecasts are based principally on mountain snow cover and on the assumption that precipitation and temperature during the forecast period will be near average. Appreciable deviations from normal of temperature and/or precipitation during the forecast period will correspondingly modify these forecasts.

	Seasonal Stream-Flow in Thousands of Acre Feet					
UPPER MISSOURI RIVER IN MONTANA	FORECAST RUNOFF	% 15-Yr. AVG.	FORE-CAST PERIOD	Measured Runoff 1957##	1956	1938-52 Average
RED ROCK RIVER						
Monida (near) (1)	65.4	81	Apr-Sept	104	60	81
#5	61.2	81	Apr-July	100	58	76
BEAVERHEAD RIVER						
Barratts (at)	151	85	Apr-Sept	204	155	177
#9	115	86	Apr-July	162	122	134
BIG HOLE RIVER						
Melrose (near)	682	92	Apr-Sept	720	842	745
#85	631	92	Apr-July	686	796	687
JEFFERSON RIVER						
Sappington (at)	955	90	Apr-Sept	1028	1045	1057
#14	848	90	Apr-July	964	967	938
MADISON RIVER						
West Yellowstone (near)	187	95	Apr-Sept	220	255	198
#104	143	95	Apr-July	168	200	151
Grayling (near) (2)	389	93	Apr-Sept	454	488	420
#106 (Net inflow to Hebgen Lk)	308	92	Apr-July	361	402	333
McAllister (near) (3)	673	93	Apr-Sept	750	802	726
#109	543	93	Apr-July	615	672	585
GALLATIN RIVER						
Gateway (near)	457	103	Apr-Sept	469	499	445
#114	393	102	Apr-July	406	443	384
Logan (at)	492	103	Apr-Sept	446	512	478
#116	421	103	Apr-July	386	452	410
Hyalite Cr. R.S. (at) (7)	37.6	107	Apr-Sept	34	29	35
#118	32.1	107	Apr-July	30	25	30
MISSOURI RIVER						
Toston (at) (3)	2134	84	Apr-Sept	2187	2345	2535*
#15	1805	82	Apr-July	1956	2098	2191*
Fort Benton (at) (4)	3372	100	Apr-Sept	3032	3131	3381
#25	2842	99	Apr-July	2608	2722	2874
Virgelle (at) (4)	4172	104	Apr-Sept	3500	3261	4013
#26	3562	103	Apr-July	3019	2806	3445
Zortman (near) (4)	4497	103	Apr-Sept	3739	3588	4357
#27	3827	103	Apr-July	3208	3076	3726
Ft. Peck Dam (below) (5)	4411	101	Apr-Sept	3365	3290	4362
#29	3822	104	Apr-July	2728	2613	3666
Williston, N.D.	10857	92	Apr-Sept	11203	9673	11750
#33	9385	92	Apr-July	9527	8102	10228

(1) Observed flow plus change in Storage in Lima Reservoir.
(2) Observed flow plus change in Storage in Hebgen Lake.
(3) Observed flow plus change in Storage in Hebgen and Ennis Lakes.
(4) Observed flow plus change in Storage in Canyon Ferry.
(5) Observed flow plus change in Storage in Canyon Ferry and Ft. Peck Reservoirs.
(7) Observed flow plus change in Storage in Hyalite Reservoir.
(##) Preliminary data furnished by U. S. Geological Survey, subject to correction.
(*) Less than 15 yrs. in 1938-52 period. Average for 15 yrs. nearest the base period.

MONTANA STREAM-FLOW FORECASTS MARCH 1, 1959

	Seasonal Stream-Flow in Thousands of Acre Feet					
UPPER MISSOURI RIVER IN MONTANA	FORECAST RUNOFF	% 15-Yr. AVG.	FORE-CAST PERIOD	Measured Runoff 1957##	1956	1938-52 Average
SUN RIVER						
Net Inflow to Gibson	787	137	Apr-Sept.	531	668	573
#1535 Reservoir	719	137	Apr-July	488	618	524
MARIAS RIVER						
Shelby (near)	650	123	Apr-Sept	519	684	527
#178	597	124	Apr-July	486	617	482
MUSSELSHELL RIVER						
Delpine (near)	7.9	116	Apr-Sept	6.0	4.8	6.8*
#216	6.5	116	Apr-July	4.9	4.1	5.6*
YELLOWSTONE RIVER						
Corwin Springs (at)	1776	95	Apr-Sept	1964	2427	1870
#317	1482	95	Apr-July	1643	2099	1556
Livingston (near)	2022	95	Apr-Sept	2272	2689	2134
#318	1669	94	Apr-July	1902	2322	1770
Billings (at)	3625	90	Apr-Sept	5133	4788	4025
#319	3112	90	Apr-July	4521	4225	3446
Miles City (at)	5775	91	Apr-Sept	7762	6175	6369
#323	4942	91	Apr-July	6764	5324	5421
Sidney (near)	5981	90	Apr-Sept	7623	6114	6648
#326	5182	91	Apr-July	6735	5315	5724
SHIELDS RIVER						
Clyde Park (at)	98.1	93	Apr-Sept	76.5	97.0	105.6
#335	91.4	93	Apr-July	71.8	94.2	98.0
ROSEBUD RIVER						
Absarokee (near)	254	97	Apr-Sept	372	251	263
#356	205	97	Apr-July	321	208	212
STILLWATER RIVER						
Rosebud Cr. (above)	315	95	Apr-Sept	463	343	331
#3515	275	95	Apr-July	413	321	288
Absarokee (near)	564	95	Apr-Sept	850	611	594
#352	474	95	Apr-July	750	529	500
ROCK CREEK						
Red Lodge (near)	103	96	Apr-Sept	154	134	107
#365	78.5	96	Apr-July	129	110	82
CLARK FORK RIVER						
Chance (at)	578	100	Apr-Sept	715	716	580
#360	518	100	Apr-July	649	660	517
Edgar (at)	599	98	Apr-Sept	785	773	614
#362	529	98	Apr-July	706	698	539

(##) Preliminary data furnished by U. S. Geological Survey, subject to correction

(*) Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.

MONTANA STREAM-FLOW FORECASTS MARCH 1, 1959

UPPER COLUMBIA RIVER IN MONTANA	Seasonal Stream-Flow in Thousands of Acre Feet					
	FORECAST RUNOFF	% 15-Yr. AVG.	FORE-CAST PERIOD	Measured Runoff 1957##	Measured Runoff 1956	1938-52 Average
CLARK FORK RIVER						
Bonner (above) (14)	901	117	Apr-Sept	655	880	771
#4155	793	117	Apr-July	580	780	678
	686	118	Apr-June	522	695	583
Missoula (above)	2271	142	Apr-Sept	1577	2012	1602
#415	2032	142	Apr-July	1425	1817	1429
	1767	144	Apr-June	1292	1622	1229
Missoula (below)	3829	129	Apr-Sept	2979	3960	2971
#439	3491	129	Apr-July	2764	3654	2700
	3058	131	Apr-June	2524	3290	2335
St. Regis (at)	5142	130	Apr-Sept	4108	5749	3951
#442	4664	130	Apr-July	3787	5326	3588
	4132	133	Apr-June	3450	4817	3112
Plains (near) (15)	13093	122	Apr-Sept	11159	15138	10747
#503	11955	122	Apr-July	10459	14070	9813
	10275	122	Apr-June	9527	12531	8434
Thompson Falls (at) (15)	14325	125	Apr-Sept	11517	15920	11479
#504	13103	125	Apr-July	10802	14809	10500
	11242	125	Apr-June	9847	13188	9009
Cabinet Gorge (at) (15)	15239	125	Apr-Sept			12211
#507	13961	125	Apr-July			11186
	11961	125	Apr-June			9584
BLACKFOOT RIVER						
Bonner (near)	1370	152	Apr-Sept	922	1132	896
#414	1234	152	Apr-July	844	1037	811
	1065	154	Apr-June	769	927	693
BITTERROOT RIVER						
Darby (near)	549	105	Apr-Sept	515	740	525
#422	510	105	Apr-July	483	701	487
	446	104	Apr-June	441	649	429
Missoula (near) (16)	1596	117	Apr-Sept	1402	1948	1369
#438	1500	118	Apr-July	1340	1837	1270
	1342	121	Apr-June	1232	1668	1106

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(14) Difference in observed flow, Clark Fork above Missoula & Blackfoot at Bonner.
(15) Observed flow plus change in Storage in Flathead Lake & Hungry Horse Reservoir.
(16) Difference in observed flow, Clark Fork above and below Missoula.
(##) Preliminary data furnished by U. S. Geological Survey, subject to correction.

MONTANA STREAM-FLOW FORECASTS MARCH 1, 1959

UPPER COLUMBIA RIVER IN MONTANA	Seasonal Stream-Flow in Thousands of Acre Feet					
	FORECAST RUNOFF	% 15-Yr. AVG.	FORE-CAST PERIOD	Measured Runoff		1938-52 Average
				1957##	1956	
FLATHEAD RIVER						
Columbia Falls (near)	1955	113	Apr-Sept	1798	2308	1729
(North Fork)	1781	113	Apr-July	1681	2139	1575
#444	1533	113	Apr-June	1523	1864	1350
Columbia Falls (at) (17)	6453	115	Apr-Sept	5716	7164	5619
#458	6016	115	Apr-July	5411	6720	5214
	5272	116	Apr-June	4962	5959	4530
Polson (near) (15)	7594	115	Apr-Sept	6525	8603	6612
#469	7064	115	Apr-July	6240	8082	6150
	6107	115	Apr-June	5715	7137	5317
MIDDLEFORK FLATHEAD RIVER						
West Glacier (near)	1901	115	Apr-Sept	1764	2093	1659*
#450	1759	114	Apr-July	1672	1956	1540*
	1485	112	Apr-June	1524	1712	1330*
SOUTH FORK FLATHEAD RIVER						
Columbia Falls (near) (17)	2446	118	Apr-Sept	1976	2593	2058
(Net inflow to Hungry	2322	119	Apr-July	1857	2488	1950
Horse Reservoir)	2069	120	Apr-June	1778	2279	1724
#457						
SWAN RIVER						
Big Fork (near)	816	140	Apr-Sept	575	750	584
#466	726	140	Apr-July	520	676	518
	604	141	Apr-June	451	581	427

(15) Observed flow plus change in Storage in Flathead Lake & Hungry Horse Res.
(17) Observed flow plus change in Storage in Hungry Horse Reservoir.
(*) Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
(##) Preliminary data furnished by U. S. Geological Survey subject to correction.

INDEX TO MONTANA & NORTHERN WYOMING SNOW COURSES

Drainage Basin and Course Name	Montana Number	Elev.	Location		Range Long.	Record Began	Measuring Dates	Measured By
			Sec. Lat.	Twp.				
		MISSOURI RIVER DRAINAGE						
JEFFERSON RIVER								
(ROCK-BEAVERHEAD)								
Lakeview Ridge	11E3	7400	27	14S	2W	1948	3,4,5	10
Lakeview Canyon	11E4	6930	26	14S	2W	1948	3,4,5	10
Limekiln	12E2	6950	5	15S	9W	1948	3,4	1
White Pine Ridge	12E1	8850	18	14S	9W	1948	3,4	1
(HORSE PRAIRIE)								
Bloody Dick	13D10	7600	12	8S	16W	1948	3,4	1
Gold Stone	13D9	8100	11	8S	16W	1948	3,4	1
Lemhi Pass	13E1	7480	9	10S	15W	1948	3,4	1
Terrell Creek	13D12	6650	14	9S	15W	1948	3,4	1
Trail Creek	13E2	7090	15	10S	15W	1948	3,4	1
Selway Junction	13D11	6800	27	8S	15W	1948	3,4	1
(BIG HOLE)								
Big Hole Pass	13D3	7240	28	3S	18W	1948	3,4	1
Big Hole Pass-Be.	13D4	6900	24	3S	18W	1948	3,4	1
East Boundary	13D5	6700	22	3S	17W	1948	3,4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	1,3
Jahnke Creek	13D8	7340	25	7S	16W	1948	3,4	1
Miner Forks	13D6	7300	24	6S	17W	1948	3,4	1
Miner Lake	13D7	6720	10	6S	16W	1945	3,4,5	1
(WISE RIVER)								
Anderson Mdw.	13D14	7000	18	3S	12W	1948	3,4	1
Elk Horn	13D15	8450	15	4S	12W	1935	3,4,5	3
Wise River	13D13	6300	15	2S	12W	1948	3,4	1
(RUBY RIVER)								
Flashlight	12D3	6950	22	8S	7W	1945	3,4,5	1
MADISON RIVER								
Hebgen	11E5	6550	22	11S	3E	1934	1,2,3,4,5	3
West Yellowstone	11E7	6700	34	13S	5E	1934	1,2,3,4,5	3
Norris Basin	10E2	7500	44°44'		110°-42'	1936	3,4	6
GALLATIN RIVER								
Devil's Slide	10D4	8100	14	5S	6E	1935	2,3,4,5	2,1
Hood Meadow	10D3	6600	22	4S	6E	1935	2,3,4,5	2,1
New World	10D1	6700	24	3S	6E	1939	1,2,3,4,5	7
21-Mile	11E6	7150	1	11S	5E	1934	1,2,3,4,5	3
MISSOURI RIVER MAIN STEM								
Chessman Reservoir	12C5	6200	2	8N	5W	1936	1,2,3,4,5	3
Crystal Lake	9C1	6100	19	12N	18E	1941	3,4	1,2
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2
Kings Hill	10C1	7950	35	13N	7E	1934	3,4,5	3
Picnic Grounds	12C6	6500	10	5N	6W	1941	2,3,4	4
Pipestone Pass	12D1	7200	11	1N	7W	1938	2,3,4,5	1
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Ten Mile Creek L	12C2	6250	13	8N	6W	1935	1,2,3,4,5	3
Ten Mile Creek M	12C3	6800	13	8N	6W	1934	1,2,3,4,5	3
Ten Mile Creek U	12C4	8000	19	8N	5W	1935	1,2,3,4,5	3
(TETON RIVER)								
Freight Creek	12A1	6000	13	26N	10W	1948	3,4	1
Waldron Creek	12B2	5600	16	25N	9W	1948	3,4	1
West Fork	12B1	6000	6	25N	9W	1948	3,4	1
(SUN RIVER)								
Benchmark	12B8	5500	9	20N	10W	1948	3,4	1
Cabin Creek	12B6	5400	33	23N	10W	1949	3,4	1,2
5-Bull	12B9	5600	36	20N	10W	1948	3,4	1,2
Gates Park	12B5	5300	31	24N	10W	1949	3,4	1,2
Goat Mountain	12B7	7000	20	22N	10W	1934	3,4	3
Wrong Ridge	12B3	6800	17	25N	10W	1949	3,4	1,2
Wrong Creek	12B4	5700	32	25N	10W	1949	3,4	1,2
(MARIAS RIVER)								
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
(MILK RIVER)								
Rocky Boy	9A1	5200	15	28N	16E	1941	3,4	7
(MUSSELSHELL RIVER)								
Grasshopper	10C2	7000	19	9N	8E	1938	3,4	2
		MISSOURI RIVER DRAINAGE (cont.)						
(UPPER YELLOWSTONE)								
Camp Senia	9D1	7890	2	8S	18E	1937	4	1
Canyon	10E3	7750	44°-44'		110°-30'	1938	1,2,3,4,5	6
Cooke City	10D7	7400	25	9S	14E	1937	1,2,3,4,5	6
Crevice Mt.	10D5	8400	22	9S	9E	1935	3,4	2
Independence	10D6	8000	22	7S	12E	1940	3,4	1
Lake Camp	10E4	7850	44°-34'		110°-24'	1936	1,2,3,4,5	6
Lupine Creek	10E1	7300	44°-54'		110°-37'	1938	1,2,3,4,5	6
Lodgepole	9E1	8200	32	56N	106W	1940	2,3,4,5	1,4
(SHIELDS RIVER)								
Porcupine	10C3	6500	10	4N	10E	1938	3,4	1
LOWER YELLOWSTONE								
(WIND RIVER) Wyoming								
Big Warm	9F12	8800	36	42N	109W	1955	2,3,4,5	1
Brooks Lake #3	10F8	9200	23	44N	110W	1939	2,3,4,5	1
Burroughs Creek	9F4	8800	15	43N	107W	1948	2,3,4,5	1
Dinwoodie	9F10	10000	21	39N	105W	1948	2,3,4,5	1
Dry Creek	9F9	9500	34	4N	6W	1948	2,3,4,5	1
DuNoir	9F6	8750	27	42N	108W	1940	2,3,4,5	1
East Fork	9F13	9200	23	44N	104W	1956	2,3,4,5	1
Geyser Creek	9F7	8500	12	41N	108W	1948	2,3,4,5	1
Little Warm	9F8	9500	24	41N	108W	1948	2,3,4,5	1
Sheridan R.S. #1	9F5	7500	3	42N	109W	1939	2,3,4,5	1
Sheridan R.S. #2	9F14	7500	3	42N	109W	1955	2,3,4,5	1
T-Cross Ranch	9F3	8000	1	43N	107W	1940	2,3,4,5	1
Togwotee Pass	10F9	9600	29	44N	110W	1936	2,3,4,5	11
(POPO AGIE RIVER) Wyoming								
Blue Ridge	8G2	9500	23	31N	101W	1939	2,3,4,5	1
Bruce's Camp	8G5	6500	24	32N	101W	1955	2,3,4	1
Hobb's Park	9G3	10000	22	2S	3W	1948	2,3,4,5	1
Mosquito Park R.S.	9G4	9500	23	2S	3W	1940	2,3,4,5	1
Sawmill Glade	8G1	8500	3	31N	101W	1939	2,3,4,5	1
South Pass	8G3	9000	13	30N	101W	1939	2,3,4,5	1
St. Lawrence	9F11	9000	26	1N	4W	1940	2,3,4,5	1
Trout Creek	9G2	8400	5	2S	2W	1948	2,3,4,5	1
(OWL CREEK) Wyoming								
Beavers Mill	9F2	8900	6	43N	102W	1948	2,3,4,5	1
Owl Creek	8F1	8700	36	43N	101W	1948	2,3,4,5	1
(GREYBULL RIVER) Wyoming								
Timber Creek #1	9E2	8800	25-	47N	103W	1948	2,3,4,5	1
Timber Creek #2	9E3	8800	25	47N	103W	1955	2,3,4,5	1
Wood River #1	9F1	8000	28	46N	103W	1939	2,3,4,5	1
Wood River #2	9F15	8000	28	46N	103W	1956	2,3,4,5	1
(SHOSHONE RIVER) Wyoming								
East Entrance	10E6	7000	17	52N	109W	1948	1,2,3,4,5	6
Sylvan Pass	10E5	7100	12	52N	110W	1936	1,2,3,4,5	6
(NOWOOD CREEK) Wyoming								
Cold Springs Camp	7E25	8700	1	50N	88W	1956	2,3,4,5	1
Medicine Lodge Lks	7E24	9500	7	51N	87W	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	48N	85W	1956	2,3,4,5	1
Tensleep Lake	7E26	9075	33	50N	86W	1956	2,3,4,5	1
Tensleep R.S.	7E7	8300	30	49N	86W	1935	2,3,4,5	1
Tyrell R.S.	7E35	8300	30	49N	86W	1956	2,3,4,5	1
(SHELL CREEK) Wyoming								
Bald Mountain	7E21	9600	33	56N	91W	1956	2,3,4,5	1
Beaver-Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Granite Creek Camp	7E22	7800	15	53N	89W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1
Horse-Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Ranger Creek	7E4	8800	32	53N	88W	1935	2,3,4,5	1
Shell Creek	7E23	9600	12	52N	88W	1956	2,3,4,5	1
(PORCUPINE CREEK) Wyoming								
Five Spgs. Falls	7E31	7500	19	56N	92W	1956	2,3,4,5	1
Medicine Wheel	7E30	9000	24	56N	92W	1956	2,3,4,5	1
(TONGUE RIVER) Wyoming								
Beaver Tongue Div.	7E20	9200	12	55N	91W	1956	2,3,4,5	1
Big Goose #1	7E2	7700	4	53N	86W	1935	2,3,4,5	1
Big Goose #2	7E32	7700	4	53N	86W	1955	2,3,4,5	1
Bone-Spring Div.	7E18	9200	32	55N	89W	1956	2,3,4,5	1
Burgess R.S. #1	7E1	7900	36	56N	89W	1950	2,3,4,5	1
Burgess R.S. #2	7E33	7900	36	56N	89W	1955	2,3,4,5	1
Dome Lake #1	7E3	8800	11	53N	87W	1950	2,3,4,5	1
Dome Lake #2	7E34	8800	11	53N	87W	1950	2,3,4,5	1
Gloom Creek	7E14	9300	32	55N	87W	1956	2,3,4,5	1
Granite Pass	7E17	8950	19	54N	88W	1956	2,3,4,5	1
		MISSOURI RIVER DRAINAGE (cont.)						
(TONGUE RIVER cont.)								
Horse Trail Div.	7E19	9200	29	55N	90W	1956	2,3,4,5	1
Lake Geneve	7E16	9000	7	52N	86W	1956	2,3,4,5	1
North Tongue	7E15	8800	17	55N	89W	1956	2,3,4,5	1
Sibley Lake	7E11	8000	10	55N	88W	1956	2,3,4,5	1
Sucker Creek	7E12	9000	19	55N	87W	1956	2,3,4,5	1
Steamboat Point	7E10	7500	32	56N	87W	1956	2,3,4,5	1
Wood Rock G.S.	7E13	8500	3	54N	88W	1956	2,3,4,5	1
(POWDER RIVER) Wyoming								
Crazy Woman	6E2	8200	6	47N	84N	1956	2,3,4,5	1
Muddy Creek G.S.	6E1	7800	2	48N	84N	1956	2,3,4,5	1
Munkers Pass	7E8	9700	11	48N	85W	1950	2,3,4,5	1
North Powder #2	7E36	8300	20	47N	85W	1956	2,3,4,5	1
Onion Gulch	7E27	8100	31	46N	85W	1956	2,3,4,5	1
Soldier Park	7E5	8700	36	51N	85W	1950	2,3,4,5	1
Sour Dough	7E6	8500	17	49N	84W	1936	2,3,4,5	1
		COLUMBIA RIVER BASIN						
KOOTENAI RIVER								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Red Mountain	15A1	6000	4	36N	29W	1937	3,4,5,5½	1,2
Weasel Divide	14A7	5450	8	37N	24W	1955	4,5,5½	1,2
FLATHEAD RIVER								
Basin Creek	13B14A	5000	11	19N	12W	1951	2,3,4,5	2
Big Creek	13B3	6750	6&7	22N	18W	1941	3,4,5	5
Brush Creek	14A4	5000	13	30N	26W	1937	3,4,5	1,2
Cattle Queen	13A1	4700	7	35N	17W	1939	3,4,5	6
Desert Mountain	13A2M	5600	24	31N	19W	1937	1,2,3,4,5	1,2
Hell Roaring Div.	14A3	5770	35	32N	22W	1942	3,4,5	1,2
Holbrook	13B13A	4530	18	21N	13W	1951	1,2,3,4,5	2
Kishenehn	14A6	3886	14	37N	22W	1954	4,5	6
Logan Creek	14A5	4300	34	30N	24W	1937	3,4,5	2
Marias Pass	13A5M	5250	34	30N	14W	1934	1,2,3,4,5	3
Mineral Creek	13A16	4000	29	35N	17W	1957	3,4,5	6
Quintonkon	13A13	3800	11	26N	17W	1951	2,3,4,5	1,2
Spotted Bear Mt.	13B2M	7000	23	25N	15W	1948	3,4,5	1,2
Strawberry Lake	13A10	6500	11	28N	19W	1948	3,4,5	2
Trinkus Lake	13B1	6500	9	25N	17W	1948	3,4,5	2
Trout Lake	13A12M	3600	21	28N	17W	1948	3,4,5	1,2
Twin Creeks	13B11	3580	14	26N	16W	1951	2,3,4,5	1,2
Upper Holland Lk.	13B5	7000	28	20N	16W	1948	3,4,5	2
CLARK FORK								
Baree Creek	15B11	5500	6	25N	30W	1956	4,5,5½	2
Baree Mountain	15B1	6000	1	25N	31W	1937	4,5,5½	2
Coyote Hill	13B10	4200	12	18N	16W	1952	1,2,3,4,5	2
El Dorado Mine	13C9	7800	23	8N	12W	1949	4	1
Fred Burr Pass	13C11	8000	12	6N	13W	1957	3,4,5	1
Freezeout Summit	15B10	6800	21	15N	27W	1937	4,5	2
Cold Creek Lk.	13C10	7200	14	8N	12W	1949	4	1
Hoodoo Creek	15C1	6200	9	14N	27W	1937	4,5	2
Intergaard	13C4	6450	6	5N	13W	1936	2,3,4	4
Lubrecht Forest #6	13C8	4400	11	14N	15W	1951	1,2,3,4,5	12
North Fork Jocko	13B7	6330	3	17N	17W	1941	3,4,5	5
Pipestone Pass	12D1	7200	10	1N	7W	1938	2,3,4,5	1
Red Lion	13C12	7000	27	6N	13W	1958	3,4,5	1
Slide Rock Mt.	13C2	7100	35	10N	16W	1937	4	1
Southern Cross	13C5	6500	8	5N	13W	1936	2,3,4	4
Stemple Pass	12C1	6900	16	13N	7W	1934	3,4,5	3
Storm Lake	13C7	7780	19	4N	13W	1939	2,3,4	1
Stuart Mill	13C6	6500	19	5N	13W	1936	2,3,4	4
Stuart Mountain	13C1	7400	6	14N	18W	1936	4	1,2
TV Mountain	14B1	6800	33	15N	19W	1956	1,2.3,4,5	1
BITTERROOT RIVER								
East Fork R.S.	13D1	5400	16	2N	17W	1937	4	1
Gibbons Pass	13D2	7100	4	2S	19W	1934	1,2,3,4,5	3,1
Lolo Pass	14C5	5230	16	38N	15E	1956	3,4,5,5½	2
Nez Perce Camp	14D2	5580	19&20	1S	23W	1937	3,4,5	1
Nez Perce Pass	14D1	6575	32	28N	17E	1937	1,2,3,4,4½,5,5½	1
Powell R.S.	14C6	4230	33	37N	14E	1956	3,4,5,5½	2
Skalkaho Summit	13C3	7259	30	6N	17W	1937	4	1
		SASKATCHEWAN RIVER BASIN						
ST. MARY RIVER								
Iceberg Lake #3	13A3	5600	48°-50'		113°-43'	1922	5	
Josephine Upper	13A15	5000	48°-50'		113°-42'	1956	5	3,9
Josephine Lower #9	13A14	4900	48°-47'		113°-41'	1955	5	
Mount Allen #7	13A7	5700	48°-46'		113°-41'	1922	5	3,9
Piegan #6	13A6	5500	48°-46½'		113°-41¼'	1922	5	3,9
Ptarmigan #8	13A8	5800	48°-50'		113°-44'	1937	5	3,9

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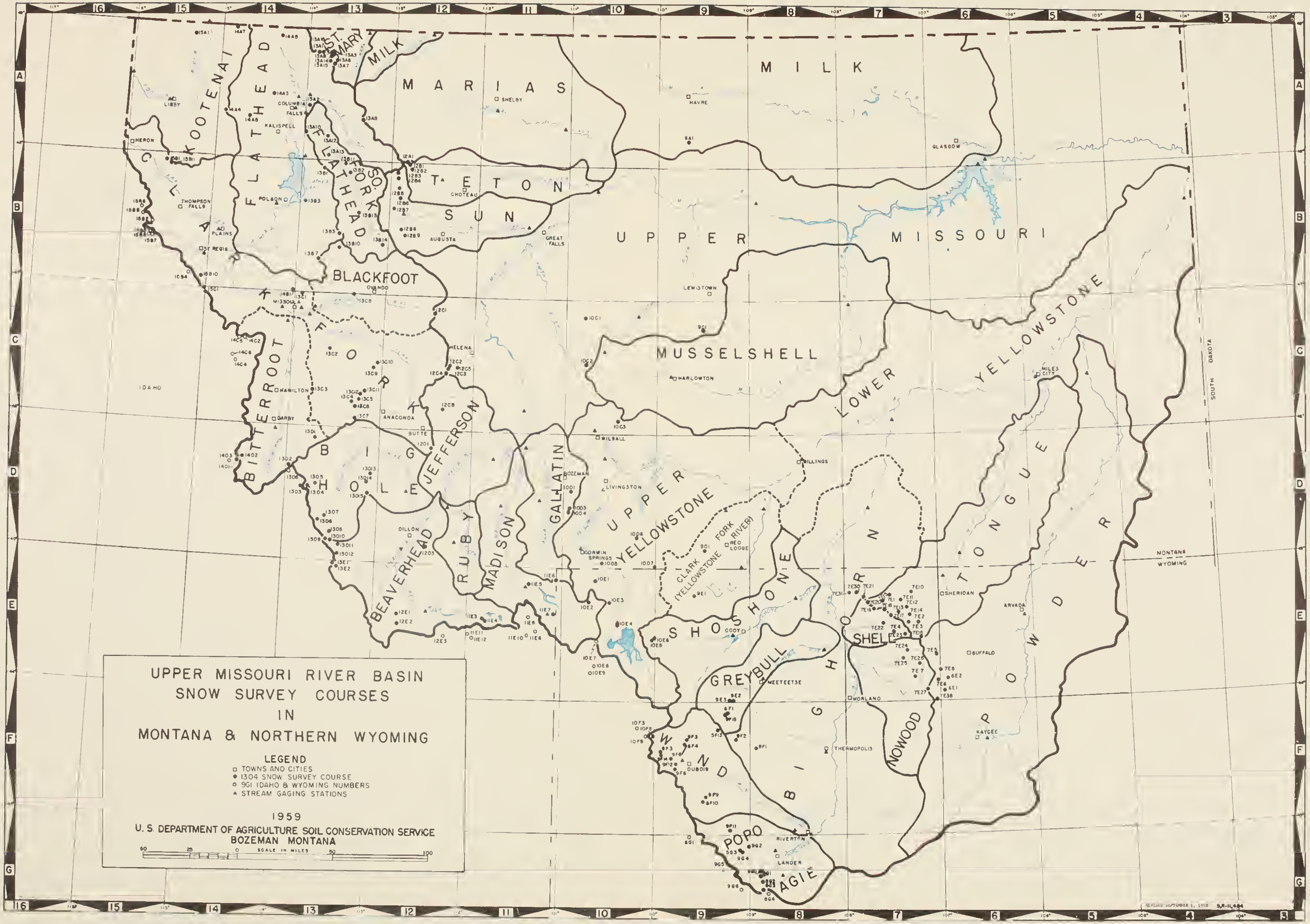
a. Numerals 1,2,3,4 and 5 refer to January 1, February 1, March 1, April 1 and May 1.

b. Numerals refer to Agency that secures the snow survey as follows:

1. Soil Conservation Service
2. U. S. Forest Service
3. U. S. Geological Survey
4. Montana Power Company
5. U. S. Indian Service
6. National Park Service
7. Montana Experiment Station
8. City of Bozeman
9. Dominion Water & Power Bureau
10. U. S. Fish and Wildlife Service
11. U. S. Bureau of Reclamation
12. Montana State Forestry School

M - Soil Moisture
A - Aerial Marker

5,R-11,484 59M-46-3(3)



UPPER MISSOURI RIVER BASIN
SNOW SURVEY COURSES
IN
MONTANA & NORTHERN WYOMING

LEGEND
- ▫ TOWNS AND CITIES
- ● 1304 SNOW SURVEY COURSE
- ○ 961 IDAHO & WYOMING NUMBERS
- ▲ STREAM GAGING STATIONS

1959

U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE
BOZEMAN MONTANA

AVAILABLE SOIL MOISTURE - ABOUT MARCH 1, 1959

Station	No.	Elev.	PROFILE Depth (In.)	PROFILE Total Water-Holding Capacity (In.)	SOIL MOISTURE CONTENT in Inches 1959	1958	1957	Yrs.
COLUMBIA-FLATHEAD DRAINAGE								
Marias Pass	13A5M	5250	48	8.39	6.93	5.45	5.30	2
Spotted Bear R.S.	13B2M	3700	28	-	5.05	4.60	4.98	2
Trout Lake	13A12M	3600	48	-	12.56	12.36	12.59	2
MISSOURI-GALLATIN DRAINAGE								
College Site	11D2M	4860	50	14.48	Frozen	5.55	7.62	2

COMPARISON OF SNOW COVER WITH THAT OF PREVIOUS YEARS

Summary of Snow-Survey Data by Tributary Watersheds March 1, 1959

TRIBUTARY BASINS	No. of Courses Averaged	No. Years Used	1959 Snow Water Equivalent Expressed as Percent of 1958	1957	Average
MISSOURI RIVER BASIN IN MONTANA					
JEFFERSON RIVER	23	11-15	113	106	97
MADISON RIVER	7	14-15	118	82	91
GALLATIN RIVER	4	15	115	122	114
MISSOURI MAIN STEM	20	10-15	172	157	132
UPPER YELLOWSTONE	8	11-15	130	98	98
COLUMBIA RIVER BASIN IN MONTANA					
KOOTENAI RIVER ABOVE LIBBY	11	10-15	130	96	99
FLATHEAD RIVER	20	8-15	133	136	128
UPPER CLARK FORK	21	8-15	123	135	135
BITTERROOT RIVER	7	15	101	107	98

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS Date of Survey	1959 Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1958	1957	15-Year Average 1938-52	Total Years of Record
JEFFERSON RIVER									
(Rock-Beaverhead)									
Lakeview Canyon	11E4	6930	2/27	36	8.6	7.7	9.7	10.0**	11
Lakeview Ridge	11E3	7400	2/27	30	7.8	7.3	8.0	7.4**	11
Limekiln	12E2	6950	2/24	T		1.8	0.7	1.3**	11
White Pine Ridge	12E1	8850	2/24	16	2.9	6.6	2.6	4.6**	11
#Camp Creek	12E3	6800	2/27	34	8.1	7.6	8.1	9.2	23
#Kilgore	11E12	6200				7.2	9.2	9.9	19
(Horse Prairie)									
Bloody Dick	13D10	7600	2/28	38	9.3	7.9	10.0	10.1**	11
Gold Stone	13D9	8100	2/28	44	13.0	10.0	12.0	13.3**	11
Lemhi Pass	13E1	7400	2/26	31	7.8	6.4	5.9	7.3**	11
Selway Junction	13D11	6800	2/25	22	5.3	5.4	7.0	7.0**	11
Terrell Creek	13D12	6650	2/25	14	3.3	4.3	4.0	4.3**	11
Trail Creek	13E2	7090	2/26	28	6.9	6.0	5.9	6.6**	11
(Big Hole)									
Below Big Hole Pass	13D4	6900	3/2	45	13.0	10.9	11.6	12.8**	11
Big Hole Pass	13D3	7440	3/2	53	15.0	12.4	12.6	14.8**	11
East Boundary	13D5	6700	3/2	26	7.4	5.8	6.0	7.0**	11
Gibbons Pass	13D2	7100	3/2	68	19.7	18.3	20.9	20.4	25
Jahnke Creek	13D8	7340	2/28	32	8.9	7.5	10.2	9.5**	11
Miner Forks	13D6	7300	3/1	37	10.0	8.2	10.3	10.5**	11
Miner Lake	13D7	6720	3/1	27	7.0	5.2	5.6	6.9**	14
#Moose Creek	13D16	6200	2/25	47	14.4	13.4	13.9	14.8*	21
Storm Lake	13C7	7780	2/24	45	12.4	9.0	9.0	10.8**	6
(Wise River)									
Anderson Meadow	13D14	7000	3/3	26	6.5	5.6	5.3	7.2**	11
Elk Horn	13D15	8450	2/27	36	8.8	7.6	7.9	8.1	24
Wise River	13D13	6300	3/3	15	6.0	4.4	4.1	4.8**	11
(Ruby River)									
Flashlight	12D3	6950	3/4	11	2.7	3.6	2.4	3.9**	14

*Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
**Average for period of record.
#Adjacent Basin.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS						Total Years of Record
						Past Record			
						Water Content (In.)			
			Date of Survey	1959 Snow Depth (In.)	Water Content (In.)	1958	1957	15-Year Average 1938-52	
MADISON RIVER									
Hebgen	11E5	6550	2/26	44	10.5	9.1	12.3	11.2	25
Norris Basin	10E2	7500	3/1	33	9.1	7.9	9.1	8.6*	16
Twenty-One Mile	11E6	7150	2/27	51	14.3	11.5	17.5	14.7	22
West Yellowstone	11E7	6700	2/26	33	8.2	6.5	11.8	10.6	25
#Big Springs	11E9	6500	2/26	59	16.3	14.4	22.0	18.3	23
#Island Park	11E10	3600	2/25	51	13.1	11.8	15.4	14.6	23
#Valley View	11E8	6500	2/26	47	11.6	9.2	13.6	13.0**	14
GALLATIN RIVER									
Devil's Slide	10D4	8100	2/28	60	19.9	17.2	14.2	16.0	24
Hood Meadow	10D3	6600	2/28	28	8.2	8.6	6.2	7.1	24
Mystic Lake	10D2	6600	Est.		8.5	-	-	-	-
New World	10D1	6700	2/27	34	10.6	8.5	5.6	8.6*	17
Twenty-One Mile	11E6	7150	2/27	51	14.3	11.5	17.5	14.7	22
MISSOURI RIVER MAIN STEM									
Chessman Res.	12C5	6200	2/26	21	5.6	1.9	2.1	4.3	23
Crystal Lake	9C1	6100	3/4	56	15.2	9.7	7.6	10.2*	18
Grasshopper	10C2	7000	3/2	22	5.0	3.5	2.7	4.3	21
King's Hill	10C1	7950	2/27	50	14.4	11.2	10.0	11.3	25
Picnic Grounds	13C6	6500	3/2	16	3.6	4.0	3.9	4.4**	14
Pipestone Pass	12D1	7200	3/1	22	5.0	3.7	3.6	4.2	21
Stemple Pass	12C1	6900	2/27	47	13.6	8.9	8.1	8.4	25
Tenmile, Lower	12C2	6250	3/1	29	7.6	4.9	4.9	5.9	24
Tenmile, Middle	12C3	6800	3/1	31	9.6	8.3	6.8	8.6	25
Tenmile, Upper	12C4	8000	3/1	47	13.4	11.2	9.9	11.2	24
(Teton River)									
Freight Creek	12A1	6000	3/1	58	18.8	9.5	13.8	15.0**	11
Waldron Creek	12B2	5600	3/1	29	8.0	3.6	5.4	6.6**	11
West Fork	12B1	6000	3/1	50	15.7	7.8	11.8	14.3**	11
(Sun River)									
Benchmark	12B8	5500	3/2	34	10.1	4.6	5.8	9.3**	10
Cabin Creek	12B6	5400	3/2	40	11.8	4.5	5.8	6.6**	10
Five-Bull	12B9	5600	3/2	29	8.6	3.1	4.2	6.6**	10
Gates Park	12B5	5300	3/2	47	14.6	7.6	8.8	9.8**	10
Goat Mountain	12B7	7000	2/25	61	19.2	6.6	9.4	8.8	25
Wrong Creek	12B4	5700	3/2	56	18.8	12.3	13.0	14.8**	10
Wrong Ridge	12B3	6800	3/2	72	26.6	15.2	18.6	20.6**	10

*Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.

**Average for period of record.

#Adjacent Basin.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS Date of Survey	1959 Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1958	1957	15-Year Average 1938-52	Total Years of Record
MISSOURI RIVER MAIN STEM (Contd)									
(Marias River)									
Marias Pass	13A5	5250	2/27	61	19.2	14.0	17.2	15.6	25
(Milk River)									
Cypress Hills	Course A	4100	3/2	9	2.7	1.3	2.2	2.2**	6
Cypress Hills	Course B	3450	3/2	6	2.2	1.3	1.8	1.4**	6
Cypress Hills	Course C	4000	3/4	16	6.9	1.8	3.4	3.7**	6
Cypress Hills	Course D	2700	3/5	7	1.8	0.5	0.9	1.2**	6
Rocky Boy	9A1	5200	2/27	20	4.7	2.8	5.8	4.6*	18
(Musselshell)									
Grasshopper	10C2	7000	3/2	22	5.0	3.5	2.7	4.3	21
UPPER YELLOWSTONE									
Camp Senia	9D1	7890	3/6	25	5.9	4.3	3.1	4.6**	14
Canyon	10E3	7750	3/1	49	12.7	10.3	14.8	10.7*	20
Cooke City	10D7	7400	3/2	32	7.5	4.6	7.7	7.0	22
Crevice Mountain	10D5	8400	2/27	31	7.5	5.3	5.3	8.3*	20
Independence	10D6	8000							
Lake Camp	10E4	7850	3/1	35	8.1	7.0	7.4	8.8*	19
Lake Camp (New)		7850	3/1	31	7.4	5.9	6.8	-	2
Lodgepole, Wyo.	9E1	8200	3/2	42	9.9	6.8	9.2	10.1**	3
Lupine	10E1	7300	3/2	35	9.5	5.6	9.8	8.9*	19
#Aster Creek	10E8	7700				21.8	29.8	24.5	40
#Thumb Divide	10E7	7900	2/26	60	16.7	15.3	19.8	19.8**	11
(Shields River)									
Porcupine	10C3	6500	3/1	Est.	5.2	4.5	4.8	5.2	21

*Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
**Average for period of record.
#Adjacent Basin.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	Date of Survey	SNOW COVER MEASUREMENTS					Total Years of Record
				1959		Past Record			
				Snow Depth (In.)	Water Content (In.)	Water Content (In.) 1958	1957	15-Year Average 1938-52	
LOWER YELLOWSTONE (Wind River)									
Big Warm	9F12	8800	2/18	35	8.1	5.7	6.7		4
Brooks Lake	10F8	9200				17.6	17.5	21.5*	21
Burroughs Creek	9F4	8800	2/19	51	13.3	8.8	9.2	13.5**	10
Dinwoodie	9F10	10000	2/20	37	9.7	6.7	10.0	10.9**	10
÷ #Dinwoodie Glaciers	9F17	10500	2/27	37	9.7	-	-	-	-
Dry Creek	9F9	9500	2/20	25	5.7	3.0	4.0	5.8**	10
DuNoir	9F6	8750	2/18	30	6.7	3.8	5.2	7.6*	18
Geyser Creek	9F7	8500	2/19	26	6.0	3.0	5.2	7.1**	10
Little Warm	9F8	9500	2/19	55	14.1	9.9	11.7	14.7**	10
Sheridan R.S. #2	9F14	7500	2/18	27	5.8	6.4	5.6		4
T-Cross Ranch	9F3	8000	2/19	29	6.0	2.5	5.2	6.3*	18
÷ Togwotee Pass	10F9	9600	2/27	87	26.8	21.5	22.6	26.3**	9
LOWER YELLOWSTONE (Popo Agie River)									
Blue Ridge	8G2	9500	3/2	26	5.8	5.7	7.1	10.1*	18
Bruce's Camp	8G5	6500	2/27	14	3.2		T		3
Hobbs Park	9G3	10000	3/2	41	11.3	7.5	13.1	16.2**	10
Mosquito Park R.S.	9G4	9500	2/25	22	4.8	3.4	4.4	6.9*	15
Sawmill Glade	8G1	8500	3/2	23	5.1	4.6	3.9	6.1*	19
#South Pass	8G3	9000	3/2	32	8.4	7.2	10.8	11.8**	19
St. Lawrence R.S.	9F11	9000	2/24	21	4.6	2.0	4.0	5.9*	15
Trout Creek	9G2	8400	3/2	21	4.4	3.0	3.5	5.1**	10
÷ #Twenty Lakes	9G7	10500	2/27	24	5.3				
LOWER YELLOWSTONE (Owl Creek)									
Beavers Mill	9F2	8900	2/26	26	5.9	3.6	3.5	6.5**	9
Owl Creek	8F1	8700	2/26	20	5.0	3.3	2.9	4.5**	10
LOWER YELLOWSTONE (Greybull River)									
Timber Creek #2	9E3	8800	2/24	11	2.8	2.3	2.6	2.8**/	4
Wood River #2	9F1	8000	2/25	19	4.6	3.2	4.1		4

* Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.

** Average for period of record.

**/Timber Creek #1 abandoned. Timber Creek #2 average obtained from relationship of old and new courses.

# Adjacent drainage. Located close to Divide.

÷ Aerial Stadia Marker. Water content estimated from snow depth.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS						Total Years of Record
				1959		Past Record			
			Date of Survey	Snow Depth (In.)	Water Content (In.)	Water Content 1958	1957	(In.) 15-Year Average 1938-52	
LOWER YELLOWSTONE (Shoshone River)									
East Entrance	10E6	7000	2/27	44	11.4	8.3	10.9	11.2**	10
Sylvan Pass	10E5	7100	2/27	51	14.1	11.6	12.7	13.1*	15
LOWER YELLOWSTONE (Nowood Creek)									
Cold Springs Camp	7325	8700	3/1	31	8.8	N.R.	3.8		
Medicine Lodge Lks.	7E24	9500	3/1	42	10.9	N.R.	7.1		
#Munkres Pass	7E8	9400				N.R.	6.5		
Onion Gulch	7E27	8100				N.R.	7.0		
Tensleep Lake	7E26	9075				N.R.	7.4		
Tensleep R.S.	7E7	8300				5.0	5.1		4
Tyrell R.S.	7E35	8300				N.R.	5.5		1
LOWER YELLOWSTONE (Shell Creek)									
#Bald Mountain	7E21	9600	2/25	64	20.8	12.6	13.0		3
#Beaver-Tongue	7E20	9200	2/24	62	19.8	11.8	12.0		3
#Bone-Spring	7E18	9200	2/27	58	16.4	10.2	11.7		3
Granite Creek Camp	7E22	7800	2/28	27	6.4	3.2	3.0		3
#Granite Pass	7E17	8950	2/27	54	15.3	9.8	12.1		3
Ranger Creek	7E4	8800	2/27	39	9.7	6.2	6.1		4
LOWER YELLOWSTONE (Porcupine Creek)									
Five Springs Falls	7E31	7500	2/27	38	10.8	4.6	3.2		3
#Medicine Wheel	7E30	9000	2/25	59	19.0	10.5	10.5		3

* Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
** Average for period of record.
# Adjacent Basin.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

			SNOW COVER MEASUREMENTS						
				1959		Past Record			
						Water Content		(In.)	
MISSOURI DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	Date of Survey	Snow Depth (In.)	Water Content (In.)	1958	1957	15-Year Average 1938-52	Total Years of Record
LOWER YELLOWSTONE (Tongue River)									
#Beaver Tongue	7E20	9200	2/24	62	19.8	11.8	12.0		3
Big Goose #2	7E32	7700	3/1	30	7.2	4.3	4.5		3
#Bone-Spring	7E18	9200	2/27	58	16.4	10.2	11.7		3
Burgess R.S. #2	7E33	7900	2/25	33	8.7	4.4	4.1		3
Dome Lake #2	7E34	8800	3/1	35	8.6	5.4	7.0		3
Gloom Creek	7E14	9300	2/26	45	13.1	7.8	7.6		3
#Granite Pass	7E17	8950	2/27	54	15.3	9.8	12.1		3
Sibley Lake	7E11	8000	2/28	42	11.7	6.4	5.7		3
Sucker Creek	7E12	9000	2/26	46	12.8	7.7	7.0		3
Steamboat Point	7E10	7500	2/28	33	9.0	3.5	3.8		3
Wood Rock G.S.	7E13	8500	2/26	41	10.1	6.2	7.2		3
LOWER YELLOWSTONE (Powder River)									
#Muddy Creek G.S.	7E28	7800				N.R.	2.0		2
#Munkres Pass	7E8	9700				N.R.	6.5		3
Onion Gulch	7E27	8100				N.R.	7.0		2
Soldier Park	7E5	8700	3/3	25	5.5	3.7	1.7	3.8**	7
Sour Dough	7E6	8500	3/4	29	6.3	4.7	4.1		3

** Average for period of record.
# Adjacent Basin.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

COLUMBIA DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	Date of Survey	SNOW COVER MEASUREMENTS					Total Years of Record
				1959 Snow Depth (In.)	Water Content (In.)	Past Record Water Content (In.) 1958	1957	15-Year Average 1938-52	
KOOTENAI RIVER (above Libby, Montana)									
Brush Creek	14A4	5000	2/26	50	14.0	11.7	11.4	12.9**	12
Ferguson	Can	3000	2/28	66	21.0	-	-	18.9**	4
Fernie	Can	3500	2/27	28	7.9	6.7	8.4	8.1*	19
Gray Creek	Can	5100	2/25	57	15.5	12.6	17.7	16.7**	10
Kimberley	Can	3800	2/28	30	8.0	5.2	7.1	6.8*	18
Marble Canyon	Can	5000	2/27	50	12.6	11.2	15.5	13.9**	12
Nelson Creek	Can	3050	2/27	51	14.6	14.6	15.7	14.0*	19
New Fernie	Can	4100	2/27	48	13.5	12.3	13.8	13.3**	8
Old Glory	Can	7000	2/27	80	22.3	25.7	21.3	25.6**	9
Red Mountain	15A1	6000	2/24	58	16.8	14.0	17.4	16.1	22
Sinclair Pass	Can	4500	2/27	23	4.7	3.6	6.1	5.6**	12
Sullivan Mine	Can	5100	2/26	49	13.4	10.6	12.3	13.1**	13
Upper Elk River	Can	4400	2/27	27	7.2	5.3	8.0	8.5**	11
Weasel Divide	14A7	5450	2/25	89	30.8	25.3	-	-	1
FLATHEAD RIVER									
Basin Creek	13B14A	5000	2/26	38	9.7	8.4	5.7	8.8**	8
Big Creek	13B3	6750	3/3	134	52.5	42.9	34.7	33.5*	18
Brush Creek	14A4	5000	2/26	50	14.0	11.7	11.4	12.9**	12
Cattle Queen	13A1	4700	3/2	97	32.7	26.1	25.6	29.6**	14
Coyote Hill	13B10	4200	3/2	40	12.4	9.5	9.4	9.9**	12
Desert Mountain	13A2	5600	2/27	57	16.5	12.4	13.5	13.1**	15
Goat Mountain	12B7	7000	2/25	50	12.4	6.6	9.4	8.8	25
Hell Roaring Div.	14A3	5700	2/23	93	31.7	23.3	27.1	27.2**	9
Holbrook	13B13A	4530	3/2	45	12.1	9.0	6.7	9.4**	8
Kishenehn	14A2	4300	2/25	38	9.6	7.9	10.0	10.2**	14
Logan Creek	14A5	4300	2/26	44	11.3	8.5	8.8	8.9**	12
Marias Pass	13A5M	5250	2/27	61	19.2	14.0	17.2	15.6	25
Mineral Creek	13A16	4500	3/2	63	23.5	16.9	18.3	17.6**	2
N. Fork Jocko	13B7	6330	3/2	132	48.4	43.4	35.6	36.0*	18
Spotted Bear Mt.	13B2M	7000	3/3	59	18.4	11.3	12.1	14.8**	11
Strawberry Lake	13A10	6500	3/1	136	45.5	32.9	33.7	35.4**	8
Trinkus Lake	13B1	6500	3/1	135	48.9	37.5	30.8	35.7**	9
Trout Lake	13A12M	3600	3/2	58	17.6	13.0	14.1	16.1**	11
Twin Creeks	13B11	3580	3/2	48	14.8	10.8	10.3	11.0**	8
Upper Holland	13B5	7000	3/1	116	41.1	23.6	27.2	30.1**	9
Weasel Divide	14A7	5450	2/25	89	30.8	25.3	-	-	1

*Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
**Average for period of record.

MONTANA SNOW SURVEYS ABOUT MARCH 1, 1959

COLUMBIA DRAINAGE BASIN AND SNOW COURSE	No.	Elev.	SNOW COVER MEASUREMENTS			Past Record			Total Years of Record
			Date of Survey	1959 Snow Depth (In.)	Water Content (In.)	Water Content 1958	Water Content 1957	(In.) 15-Year Average 1938-52	
CLARK FORK									
Chessman Res.	12C5	6200	2/26	21	5.6	1.9	2.1	4.3	23
Coyote Hill	13B10	4200	3/2	40	12.4	9.5	9.4	9.9**	12
East Fork R.S.	13D1	5400	2/26	28	7.1	6.5	5.8	5.5**	8
Eldorado Mine	13C9	7800	2/26	63	20.5	13.6	13.1	15.7**	6
Fish Lake Airstrip	15C2	5000	3/2	93	36.2	35.2	-	35.9**	6
Fred Burr Pass	13C11	8000	2/24	72	25.3	19.0	16.9	18.0**	2
Gold Creek Lake	13C10	7200	2/26	50	15.3	11.0	10.6	12.9**	6
Hoodoo Creek	15C1	6200				-	-	50.0**	5
Intergaard	13C4	6450	3/2	28	7.6	6.8	6.5	6.2	23
Lubrecht For. #6	13C8	5400	3/3	15	4.7	4.1	3.1	4.3**	8
N. Fork Jocko	13B7	6330	3/2	132	48.4	43.4	35.6	36.0*	18
Picnic Grounds	12C6	6500	3/2	16	3.6	4.0	3.9	4.4**	14
Pipestone Pass	12D1	7200	3/2	22	5.0	3.7	3.6	4.2	21
Red Lion	13C12	7000	2/24	52	15.2	12.2	-	-	1
Slide Rock Mt.	13C2	7100	2/25	43	12.4	9.9	9.7	10.4**	4
Southern Cross	13C5	6500	3/2	21	6.1	5.6	5.8	4.6	23
Stemple Pass	12C1	6900	2/27	47	13.6	8.9	8.1	8.4	25
Storm Lake	13C7	7780	2/24	45	12.4	9.0	9.0	10.8**	6
Stuart Mill	13C6	6500	3/2	22	6.2	5.5	5.4	5.2	23
Stuart Mt. #1	13C1	7400	3/1	89	33.2	29.4	27.2	24.4*	16
Tenmile, Lower	12C2	6250	3/1	29	7.6	4.9	4.9	5.9	24
Tenmile, Middle	13C3	6800	3/1	31	9.6	8.3	6.8	8.6	25
Tenmile, Upper	12C4	8000	3/1	47	13.4	11.2	9.9	11.2	24
TV Mountain	14B1	6800	2/24	62	18.6	14.4	13.6	-	3
#49 Meadows	13B3	5000				33.6	27.8	20.3*	18
#Lookout	15B2	5250	2/27	100	33.9	33.6	30.3	30.7	34
BITTERROOT									
East Fork R.S.	13D1	5400	2/26	28	7.1	6.5	5.8	5.5**	8
Gibbons Pass	13D2	7100	3/2	68	19.7	18.3	20.9	20.4	25
Nezperce Camp	14D2	5580	2/27	39	8.7	12.7	11.4	11.2*	19
Nezperce Pass	14D1	6575	2/27	48	13.7	11.0	12.4	15.2*	20
TV Mountain	14B1	6800	2/24	62	18.6	14.4	13.6	-	3
#Lolo Pass	14C5	5230	2/25	84	28.0	28.5	29.1	27.9**	15
#Moose Creek	13D16	6200	2/24	47	14.4	13.4	13.9	14.8*	21
#Powell R.S.	14C6	4230	2/25	43	12.5	12.7	14.3	-	2

*Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
**Average for period of record.
#Adjacent Basin.

STATUS OF RESERVOIR STORAGE
March 1, 1959

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET				
			1959	1958	1957	1938-52 AVG.	YRS
MISSOURI RIVER BASIN - MONTANA							
Beaverhead	Lima	84.0	31.1	26.7	6.4	30.9*	18
Madison River	Hebgen Lake	345.0	168.2	157.4	158.1	234.7	23
Madison River	Ennis Lake	41.0	38.9	38.8	38.4	34.1	23
Hyalite Creek	Middle Creek	8.0	4.2	3.7	3.1	3.6**	7
Missouri River	Canyon Ferry	2043.0	1687.0	1575.0	1488.0	1332.0**	5
Missouri River	Hauser Lake & Lk. Helena	62.5	59.0	59.0	62.5	46.2*	19
Missouri River	Lake Helena	10.4	9.4	9.2	10.5	8.3**	13
Missouri River	Holter Lake	81.9	45.3	76.7	78.8	53.3	21
N.Fk. Sun River	Gibson	105.0	76.1	29.0	39.6	59.6	23
N.Fk. Sun River	Willow Creek	32.3	29.3	19.8	23.4	12.9	23
N.Fk. Sun River	Pishkun	32.0	19.7	12.3	16.5	15.6	23
Marias River	Tiber	1316.0		625.2	630.7		3
Birch Creek	Swift	30.0		19.0	23.7	19.5	23
Dupuyer & Birch	Lake Francis	112.0		94.0	90.0	72.8	23
Judith River	Ackley Lake	5.8		4.6	3.7	4.2*	19
Missouri River	Ft. Peck 3/	19410.0	8848.0	7748.0	6019.0	11240.0*	18
Milk River	Fresno	127.2	28.7	55.9	75.1	56.2*	18
Milk River	Nelson	66.8	41.4	49.8	51.4	28.5	23
W. Rosebud Cr.	Mystic Lake	20.8	8.5	7.4	6.0	8.0	23
Tongue River	Tongue River	68.0	15.4	9.0	10.8	10.0*	17
Swiftcurrent Cr.	Sherburne Lk.	66.1	36.9	21.0	18.8	19.0	23
MISSOURI RIVER BASIN - WYOMING							
Shoshone River	Buffalo Bill	440.0	00.0	161.9	128.2	264.5	24
Wind River	Boysen	408.6AC	78.2	249.1	220.0	260.3**	7
Wind River	Pilot Butte	31.6	9.7	15.9	14.3	14.5	23
Bull Creek	Bull Lake	152.0	49.0	66.5	67.8	56.7	20
Belle Fourche	Key Hole	190.0AC	0.0	1.9	14.1	13.3**	7

* Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.
** Average for period of record.
3/ Gross contents: usable capacity less 617.0 A.F; minimum power pool 4,500 A.F.
AC Active Capacity - USBR Billings.

STATUS OF RESERVOIR STORAGE
March 1, 1959

BASIN & STREAM	RESERVOIR	USABLE CAPACITY 1000 A.F.	USABLE STORAGE - 1000 ACRE FEET				
			1959	1958	1957	1938-52 AVG.	YRS.
MISSOURI RIVER BASIN - NORTH DAKOTA							
Heart River	Heart Butte	54.8AC	42.3	55.3	43.7	53.4**	9
Heart River	Dickinson	4.3AC	3.7	4.2	3.2	3.8**	8
Missouri River	Garrison Lk.	13805.0AC	2478.6	4448.0	535.2		4
James River	Jamestown	20.0AC	12.5	10.4	4.7		2
MISSOURI RIVER BASIN - SOUTH DAKOTA							
Belle Fourche	Belle Fourche	185.0AC	39.3	66.0	37.0		3
Cheyenne River	Angostura	160.0AC	44.1	55.9	27.8		3
Cheyenne River	Deerfield	15.1AC	8.9	11.3	8.2	11.3**	6
Grand River	Shadehill	84.0AC	71.2	79.4	133.4	134.4**	6
Missouri River	Ft. Randall	4900.0AC		1552.4	1090.7		4
Missouri River	Gavins Point	385.0AC		325.1	419.7		2
Missouri River	Oahe	Total	696.0				0
Cheyenne River	Pactola	14.8AC	18.7	13.9	1.45		2
COLUMBIA RIVER BASIN - MONTANA							
Flint Creek	Georgetown Lk.	31.0	26.1	19.9	19.2	22.9*	19
S.Fk. Flathead	Hungry Horse	3500.0	2623.0	2088.0	1802.0	2199.3**	5
Flathead River	Flathead Lake	1791.0	920.7	872.6	849.8	679.2	15
Flathead River 6/	Camas Res.	42.8	25.9	26.0	29.9	21.1*	18
Flathead River 7/	Mission Valley	98.6	28.4	19.7	28.5	36.8*	18

* Less than 15 years in 1938-52 period. Average for 15 years nearest the base period.

** Average for period of record.

6/ Camas Reservoirs are shown as a sum of (4) small reservoirs on the west side of Flathead Lake located on Dry Creek and Little Bitterroot River.

7/ Mission Valley Reservoirs are shown as a sum of (8) small reservoirs located south and east of Flathead Lake. Both Camas and Mission Valley reservoirs are operated by the Indian Irrigation Service.

AC Active Capacity - USBR Billings.

Agencies Cooperating in Collecting Data Contained in this Bulletin

U. S. Forest Service
Region I, Missoula, Montana

U. S. Geological Survey
Helena, Montana

U. S. Army Corps of Engineers
Portland, Oregon
Seattle, Washington
Omaha, Nebraska
Riverdale, N. D.

U. S. Indian Irrigation Service
St. Ignatius, Montana

U. S. Weather Bureau
Helena, Montana

U. S. Fish & Wildlife Service
Red Rock Lakes Refuge
Monida, Montana

U. S. Bureau of Reclamation
Billings, Montana
Boise, Idaho

Montana Power Company
Butte, Montana

Agricultural Experiment Station
North Montana Branch Station
Havre, Montana

National Park Service
Yellowstone National Park
Glacier National Park

Montana Experiment Station
Montana State College
Bozeman, Montana

City of Bozeman
Bozeman, Montana

Bonneville Power Administration
Portland, Oregon

Montana State School of Forestry
Montana State University
Missoula, Montana

Soil Conservation Service
Montana, Wyoming, Idaho

Soil Conservation Districts
Montana Counties

Johnson Flying Service, Inc.
Missoula, Montana

Water Rights Branch
Dept. of Lands & Forests
Victoria, British Columbia

Department of Northern Affairs
& National Resources
Calgary, Alberta

Federal - State - Private
COOPERATIVE SNOW SURVEYS

Furnishes the basic data
necessary for forecasting
water supply for irrigation,
domestic and municipal water
supply, hydro-electric power
generation, navigation,
mining and industry

*"The Conservation of Water begins
with the Snow Survey"*